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NOTES ON THE EUPHORBIAS OF DR. EDWARD
PALMER'S DURANGO (MEXICO) COLLECTION
OF 1896.

CHARLES F. MILLSAUGH.

THE following notes, based upon Dr. Edward Palmer's 1896 collection from the neighborhood of the city of Durango, Mexico, while offering but little in the line of novelties, will serve to emphasize the necessity of closer study into the relationship of species in the extensive and intricate genus *Euphorbia*.

Upon continual comparison of the various species, I have become more than ever convinced that the general habit gives but little insight to true specific character, especially in the *Anisophyllæ*, and that it is in the seeds only that absolute constancy of character exists. These seeds, minute as they are, retain their specific character even when the general characters of the plant become radically changed by the environment. In regard to the involucre, little can be determined by them except by careful and complete dissection and evisceration of the tubal envelope, the walls and appendages of which only then exhibit their true characters. It would appear that in the typical *Euphorbia* there are five glands in alternation with five involucre lobes; thus wherever one or more glands are absent in a species some rudiment of these organs remains. This is indicated by the five heavier veins or bands of thickened tissue that lead up from the pedicel to these appendages. While the lobes of the involucre, that play so serious a part in the fructification of the ovule, are constant in their character, the glands and their rudiments, being accessories only, vary much with the habitat and environment of the individual.

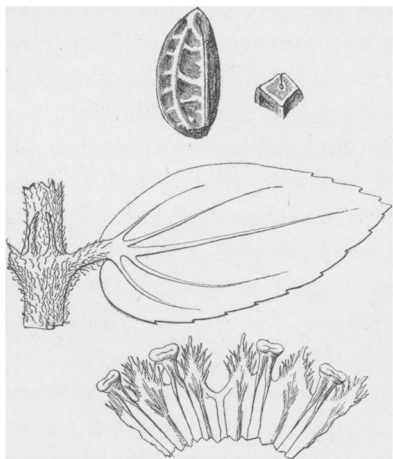
In any series of species the size variation is so great that no specific scale of drawing can be profitably maintained, nor would the invariable application of such scale be of practical value.

Therefore, in the cuts accompanying the species here noted, the opened involucre is diagrammatic, and no size relation exists in the magnified seed.

§ ANISOPHYLLUM, *Hypericifoliæ*.

EUPHORBIA PILULIFERA PROCUMBENS (DC.) Boiss. DC. Prod. 15: 21.

In this form the stipules are linear-lanceolate, a pair on each surface of the stem, the superior pair with an interstipular gland.



As in *E. lineata* the lobes of the involucre are not "fimbriate," but very hairy; the fact that the hairs are as large as those of the branchlets causes them to appear—in comparison with the minute lobes of the involucre—as if they were fimbriæ. The fifth gland is replaced by a deep notch through which passes the recurved stipe of the fruit. The seeds are pinkish, sharply quadrangular, 0.8^{mm} long, 0.4^{mm} broad, the

concave facets marked by several transverse ridges, some of which are extended but part way across the facet.

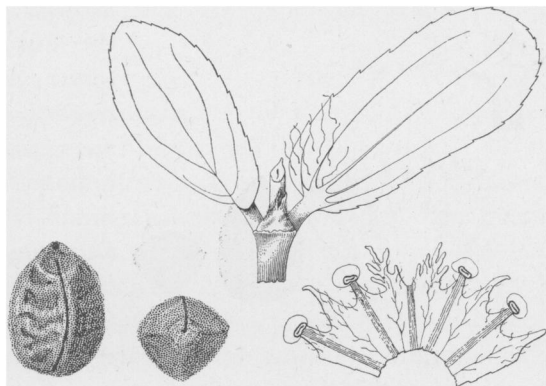
Dr. Palmer's [360 Durango 1896] specimens are the most robust that I have seen. Dr. Schott's Yucatan 56 and 57 are much smaller plants, although the leaves and involucre are of the same size as those in Dr. Palmer's form. Dr. Gaumer's Yucatan 315 is a counterpart of those of Dr. Schott, but his 1003 seems to be a transition to the species itself. Dr. Ridell's Key West 1839 is the same as the Schott Yucatan form, while Valdez Yucatan 2 is very near Dr. Palmer's Durango plants.

EUPHORBIA PRESILII Guss. Fl. Sic. Prod. 1: 539.

The various forms of this species throughout its range readily account for its frequent confusion with *E. hypericifolia* L. I

have an exact counterpart of Dr. Palmer's 206 Durango in a specimen collected by myself at Waverly, N. Y.; this form has all the leaves large, broad, and lurid. His Durango 894 (similar but with pale green leaves) is duplicated in H. N. Patterson's Oquawka (Ill.) form; while his Durango 900, with its slender and strongly falcate leaves, has its counterpart in Addison Brown's Rhinebeck (N. Y.) and W. C. Werner's Painesville (Ohio) plants. These are all very evident *E. Preslii*, but in a large number of forms from Rio Janeiro to Canada the macroscopic differentiation between this species and *E. hypericifolia* is almost impossible, as the erect or prostrate growth, the smooth or hairy branches, the full or part serration of the leaves, the fimbriation or ciliation of the triangular or lanceolate stipules, the presence or absence of a red spot on the leaves, the size or shape of the glandular appendages or lobes, and the depth of the sulcus bifurcating the styles, intermixes both species in these characters; however, the seed stands out clear and definite in them all, that of *E. Preslii* being ovoid and black, and having a prominent lighter dorsal angle.

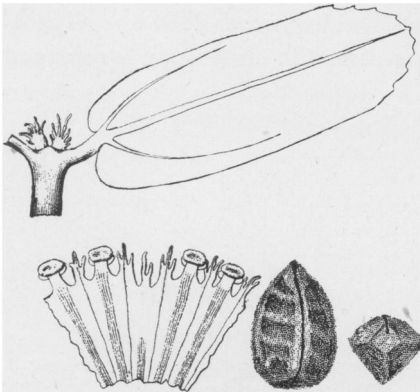
The special characters of this species are as follows: Glandular appendages manifest and entire, the fifth gland replaced by a shallow sulcus flanked on each side by larger and lacerate involucre lobes, the other three lobes being entire and triangular. The seeds are ovoid, black, with somewhat ashen angles, 1.3^{mm} long and 0.8^{mm} broad; the ventral surface is strongly convex, the dorsal triangular with a prominent central ridge rendering the whole sub-quadrangular, the several partly anastomosing transverse ridges on each facet being



slight and ashen. In this and the related species, *E. hypericifolia*, *E. nutans*, *E. lasiocarpa*, and *E. Braziliensis*, there exists a minute black caruncle that appears to have escaped the attention of the authors of the species.

EUPHORBIA NUTANS Lag.? Gen. et. Sp. nov. 17.

In Dr. Palmer's 226 Durango we find a form that answers exactly to Lagasca's species, so far as his meager description gives the characters of his plant. In the absence of his type, I cannot do better than to accept, as a basis of differentiation between it and *E. Preslii*, his "floribus axillaribus solitariis," which cannot possibly mean any known form of the glomerate flowered *E. Preslii*. Lagasca says: "Caule patulo dichotomo villosa: ramis apice floriferis nutantibus: foliis ovato-oblongis subcordatis obsolete serratis: floribus axillaribus solitariis," to each and every character of which Dr. Palmer's plant agrees, except mayhap the "villosa," a character never determinative or constant in any plant. Taking this form, therefore, to answer to *E. nutans* Lag., I add the following to the original descrip-



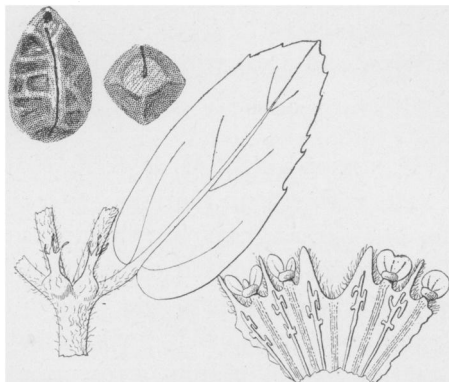
tion: *Caule patulo dichotomo villosa* at the extremities of the branches only, *ramis apice floriferis*, the upper angulate, the lower striate, the stems terete; *foliis ovato-oblongis subcordatis obsolete serratis* at the apex, 3-nerved; stipules interpetiolar, triangular, long fimbriate-ciliate; *floribus axillaribus solitariis*, involucre small, turbinate, long pediceled; lobes lanceolate, 3 to 4-irreg-

ular-fimbriate, glands 4, small, ovate, appendages little more than a sarcous dorsal ridge upon the stipe of each gland, fifth gland replaced by a 2-fimbriate smaller involucral lobe; capsule glabrous, carpels obtuse; seeds ashen-black, the transverse rugæ more prominent than in *E. Preslii*, the ventral suture extending from the caruncle downward, and the dorsal angle sharper.

The determination of this species must be considered provisional.

EUPHORBIA LASIOCARPA Klot. Nov. Act. 19: suppl. 414.

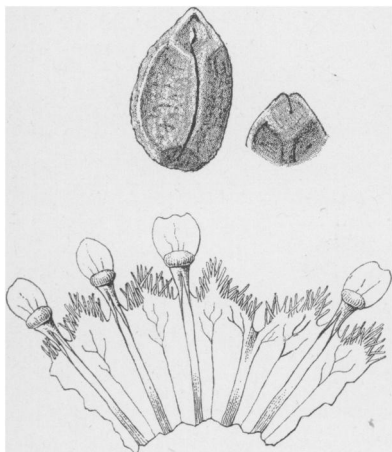
In addition to Boissier's description of this species, in DC. Prod. 15: 23, might be given the following characters: *Stipulis interpetiol.* roseate beneath, *brevis triangularibus* 2 to 3-fimbriate at the apex. *Semine* brownish red *ovato-quadrangulo*, 1.1^{mm} long, 0.7^{mm} broad, the ventral surface convex, the dorsal



triangulo-convex. The anastomosing ridges on facets of this species are much more prominent than in *E. Preslii*, and the angles more obtuse.

Nos. 198 and 199 of my collection (Yucatan Allison V. Armour Exped. 1895) belong to this species, not to *E. hypericifolia* as given in Contrib. 1: 27, Field Col. Mus. Bot. Dr. Arthur Schott returns the species from Merida, and Dr. Gaumer from Izamal (882), Yucatan

EUPHORBIA LINEATA Watson, Proc. Am. Acad. 21: 455.



Leaves short petiolate, more crenate than serrate, stipules lanceolate-aristate on the upper side of the branch, lanceolate-fimbriate on the under side. The involucre lobes of the type are not "lacerate" but triangular-hairy, the hairs appearing like lacerations, the glandular appendages are small, oblong entire or 1 to 3-notched at the apex. The fifth gland is represented by a deep sulcus between the two larger involucral

lobes. A distinctive feature in this species is the presence of glands at each bifurcation of the paniced inflorescence, large counterparts of the involuclral glands.

Dr. Palmer's 618 Durango specimens differ from the type in their somewhat larger appendages, longer and more hairy petioles, and more robust habit.

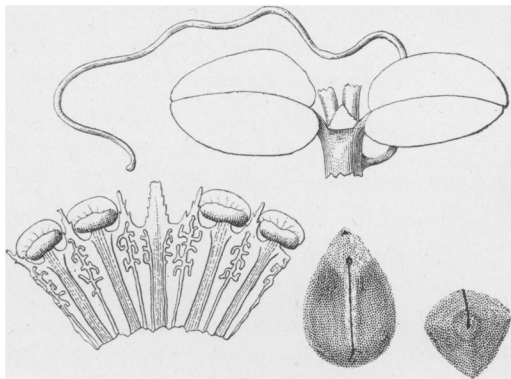
Chamæsyce.

E. SERPENS Kth. H. B. & K. Nov. Gen. et Sp. 2:41.

Dr. Palmer's 42 Durango specimens of this species are very close to var. *radicans*, but the appendages are plainly to be seen. The stipules are interesting, those of the extremities of the branches being roseate and longer than the floral leaves, those of the lower leaves being subtended by a small peltate-stipitate gland or pair of glands, a feature also present in Pringle's 3778 from San Louis Potosi, 1891. Dr. Palmer also returns from Durango (819) a small rosulate-prostrate form with minute leaves, and a general roseate color.

EUPHORBIA SERPENS RADICANS (Moric.) Engelm. DC. Prod. 15: 30.

In *E. serpens* and its forms the fifth gland of the involucre is replaced by a truncate serrate lanceolate lobe. The venation of



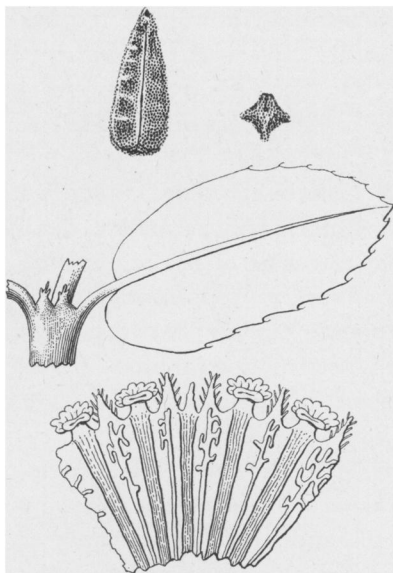
the involucre throughout the *Chamæsyce* is interesting, as by its size and maze-like character it plainly shows this body to be evolved from the leaf, where this venation is continued in an anastomosing network of the same elemental type. The seeds are

pink, somewhat pyriform, 0.8^{mm} long, 0.5^{mm} broad, triangular with a convex ventral surface, and sharp dorsal angle.

Dr. Palmer's 296 Durango, fine robust examples, have red-maculate leaves, frequent radication towards the ends of the branchlets, nearly entire (simply erose) stipules and exappendiculate glands. Specimens collected by Dr. Mohr, and Newman in Alabama agree well with Dr. Palmer's, while those of Pammel from Iowa, Eggert from Illinois, Dr. Krause from Missouri, and myself from West Virginia have very evident white or roseate glandular appendages, and fimbriate-margined stipules.

EUPHORBIA PROSTRATA Ait. Hort. Kew. 2 : 139.

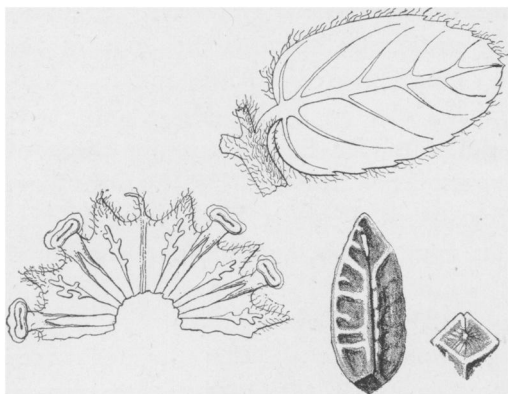
Dr. Palmer's Durango specimens of this species agree with the description of Boissier in DC. Prod. 15 : 47, except in having appendages as long as the width of the gland, and 3-several round-dentate on the margin. In this species the fifth involucral gland is replaced by a small triangular-entire sixth lobe, the stems are striate, and the leaves denticulate all along the lower, and for one-half the upper margin. The seeds are pink, strongly tetragonal, narrowly elongate-pyriform, 1.5^{mm} long, 0.6-7^{mm} broad, and have all the facets concave and traversed transversely by numerous anastomosing rugæ.



In Dr. Palmer's 897 the leaves are larger and all parts except the involucre more robust than in his 225, in which nearly all the leaves are of the character of the minute floral leaves in the first.

EUPHORBIA STICTOSPORA Engelm. Mex. Bound. Bot. 187.

The triangular involucral lobes of this species are not "profunde fimbriatis" but densely hairy, the hairs being of the same size and structure as those of other parts of the plant. The fifth



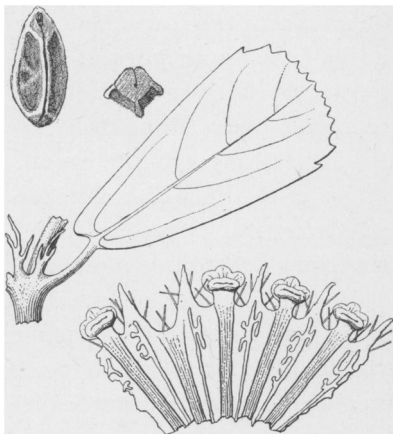
gland of the involucre is replaced by a triangular-linear sixth lobe. The involucre is more subcylindrical than turbinate. Seed ashen, somewhat falcate laterally, elongated-tetragonal, 1.4^{mm} long, 0.5^{mm} broad, the ventral facets concave, crossed

by several prominent regular rugæ; the dorsal facets plane, densely covered by prominent irregularly anastomosing rugæ.

Dr. Palmer's 43 Durango specimens agree with the type, and are counterparts of Pringle's 80 Jimulco Valley, and 1076 plains of Chihuahua.

EUPHORBIA SERPYLLIFOLIA Pers. Ench. Bot. 2:14.

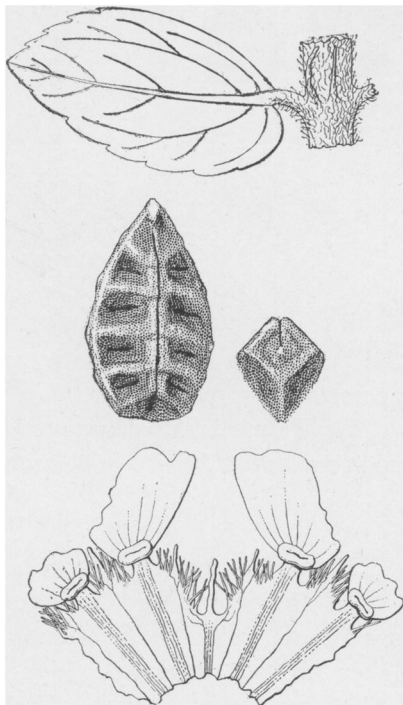
This species is readily distinguishable by its truncate-serrate leaves. The fifth gland of the involucre is represented by a truncate sulcus between two enlarged involucre lobes. Seeds ashen or amber-color, 1.1^{mm} long, 0.6^{mm} broad, strongly tetragonal; the facets of the ventral surface concave, marked by a few indistinct rugæ; those of the dorsal surface convex, rugæ anastomosing, and somewhat more evident.



In Dr. Palmer's 899 Durango the involucre are externally hairy, otherwise—though robust in habit—his specimens agree with the type, and with E. L. Greene's Bear creek (Colorado) and M. E. Jones' 3998 Flagstaff (Arizona).

EUPHORBIA ADENOPTERA Bertol. Misc. Bot. 3 : 436.

In this species a deep cleft replaces the fifth involucreal gland which is also represented by a linear sixth lobe, otherwise the involucre is not "profunde fissis." The involucreal lobes are more linear than "lanceolatis." The seed is pinkish-white, strongly tetragonal, 1^{mm} long, and 0.5^{mm} broad, all the facets plane and deeply scored by four or five transverse pits, the ridges separating which are projected to include the angles of the seed.



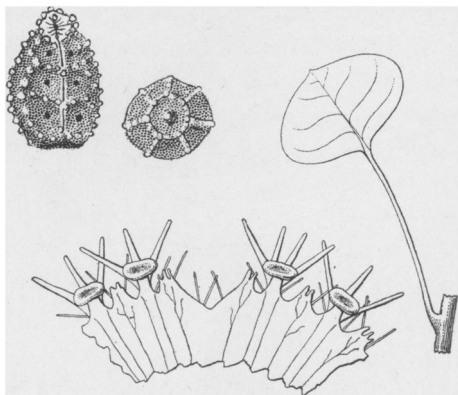
Dr. Palmer's 898 Durango agrees exactly with a part of J. G. Lemmon's Rucker valley and Churricahua mountains (Arizona) specimens. All these might be termed *forma rosea*, as the appendages and glands are so deep a red as to give the whole plant a roseate appearance. My Chichen Itza Yucatan 107 Allison V. Armour Exped. specimens are also of this form, but differ in having all the stem leaves narrowly lanceolate like the intrafloral leaves of the usual form. Dr. Arthur Schott's 966 Sisal, Yucatan, is apparently a transition from the last to the first form, while Dr. Gaumer's 938 Izamal is more markedly like the Durango form, his specimens being the largest I have seen; his 939 Sitilpech is, however, a very straggling open growth with long virgate branches.

§ CYTTAROSPERMUM.

EUPHORBIA SUBRENIFORME Watson, Proc. Am. Acad. 21 : 439.

In this species the fifth involucreal gland is represented by a

deep triangular sinus flanked by unaltered lobes. Involucral



lobes 2-4-irregular toothed (not entire, ciliate, as described). Walls of the involucre thin-membranous, columnæ wanting, external hairs few, setose. Seed ashen, globular-pyriform, 1.1^{mm} long, 0.8^{mm} broad, the facets marked by 3-4 shallow punctate pits deepened by tuberculate dividing ridges,

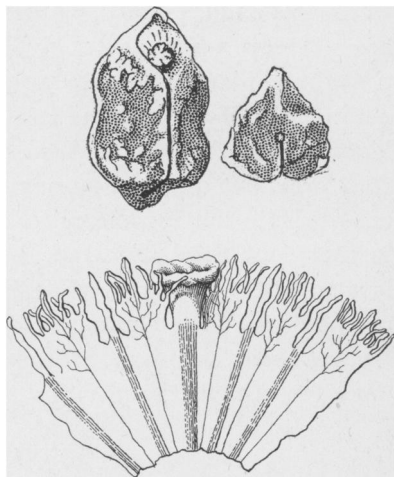
the tubercles tipped with an amber-colored mucilaginous accretion.

Dr. Palmer's 896 Durango agrees fully with C. G. Pringle's 2063 and 2302 Jalisco specimens.

§ POINSETTIA.

EUPHORBIA DENTATA LASIOCARPA Boiss. DC. Prod. 15: 72.

In this form and in the species as well, the involucral lobes are not dentate as described, but long-fimbriate. The four missing glands are replaced by an equal number of linear involucral lobes. Seeds dark reddish-brown, 2.4^{mm} long by 2^{mm} broad, sharply triangular in section, the facets, especially those of the dorsal surface, roughly white tuberculate.



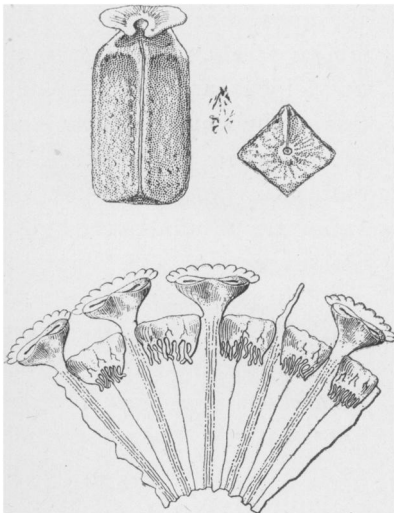
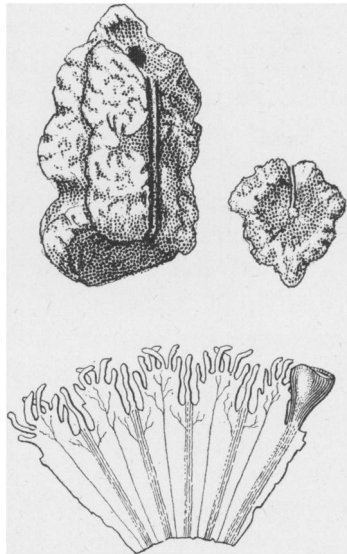
Dr. Palmer's 660 in part and 895 Durango specimens are the most usual form of this variety.

EUPHORBIA HETEROPHYLLA GRAMINIFOLIA (Michx.) Engelm.
 Mex. Bot. 190.

Dr. Palmer's 659 Durango is the typical form of this variety, the lower leaves being scabrous above, and strigose with long scattered hairs beneath. The four missing involucral glands are represented by a like number of linear lobes. The seeds, instead of being lenticular in section as in the species, are even more sharply triangular than in var. *eriocarpa* Millsp.

EUPHORBIA JALISCENSIS Rob. & Greenm. Proc. Am. Acad. 29: 392.

Dr. Palmer, in his 660 (in part) Durango, rediscovers this interesting species, first collected in the



barranca of Tequila by Pringle (4608) in 1893. His specimens agree with the type except that they are less robust in habit; notwithstanding this the leaves show still more clearly their sessile character.

In this species the leaves tend rather to be acute than obtuse; although apparently "winged petiolate," the dilation of the wings at the juncture with the stem, and their continuation above with the leaf, proves them sessile. The glands are stipulate, with appendages 8-12-crenate-dentate. The fifth involucral gland is represented

by a linea blunt lobe. The involucral lobes are strongly

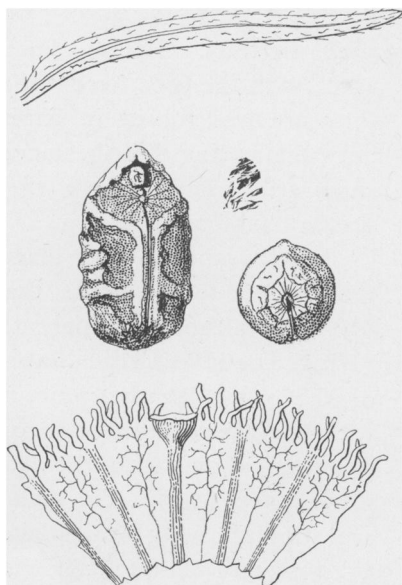
incurved. The striking columnar dark seeds are almost perfectly tetragonal, 4.5^{mm} long, and 2^{mm} broad, with the concave ventral facets slightly papillate; the caruncle is large, stipitate, and shaped like a water-carrier's neck yoke.

EUPHORBIA JALISCENSIS **Durangensis** var. nov.

This form differs from the species in its denser foliage and more ramose habit. Heterophyllous; lower leaves linear-lanceolate, 0.5 to 4 inches long, upper leaves spatulate to panduriform, dentate at the cuneate apex, 1–2 inches long, as broad above the constriction as below. Involucre smaller than in the species, the glands less stipitate, the appendages narrower and only 4–6-crenate-dentate, the seed blacker and smaller (3^{mm} long, 1.8^{mm} broad), and the caruncle simply peltate.

Collected by Dr. Edward Palmer in the vicinity of Durango, 1896 (658).

*EUPHORBIA RADIAN*s Benth. Pl. Hartweg. 8.



The involucre of this species, described by Boissier (DC. Prod. **15**: 74) as subsessile, are pediceled one-half the length of the tube; the involucral lobes are from 4–6-fimbriate, the four missing glands are replaced by similar 1–2-fimbriate false lobes. The seeds are ashen, ovate, globular in section, 4.1^{mm} long, by 2.5^{mm} broad, the ventral facets marked by a strong transverse ridge, the dorsal by two, and numerous irregular verrucæ, not “smooth;” a smooth seeded species could hardly belong to *POINSETTIA*.

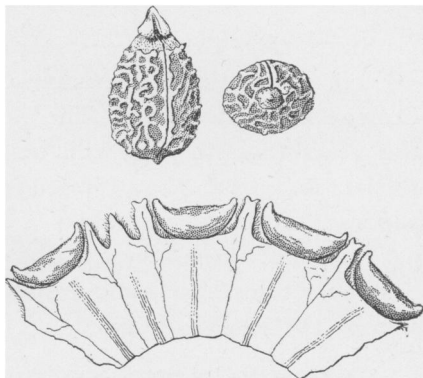
In Dr. Palmer's 34 Durango, the strigose hairy leaves are

very characteristic, and agree with J. G. Lemmon's Huachuca mountains and C. Mohr's Gila river (Arizona) forms.

§ TITHYMALUS.

EUPHORBIA CAMPESTRIS Cham. & Schl. Linn. **84**: 1830.

In this species the fifth gland is replaced by a triangular pointed lobe, broader at the base than the involucre lobes, which are in part triangular and part fusiform with a bifurcate apex. The seed is oval, lenticular in section, 2^{mm} long, 1.3^{mm} broad, dark brown, the surface reticulate with rounded anastomosing whitened-farinose ridges. Caruncle conical stipitate, deeply notched on the ventral surface.



Dr. Palmer's 72 Durango is the typical form of the species, with long virgate branches denuded below and terminated by numerous narrowly-lanceolate mucronate-tipped leaves, and a single 3-5 flowered umbel.

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